

REMARKS

Claims 21-24, 27-36, 38, 39, 41, and 42 are pending in this application, of which claims 27-32 have been withdrawn from consideration.

§ 103(a) Rejection of Claims 21, 23, 33, 35, 38, 39, 41, and 42 over *Shimizu et al.*, *Sawasaki et al.*, and *Kishimoto et al.*

Applicant respectfully traverses the rejection of claims 21, 23, 33, 35, 38, 39, 41, and 42 under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent Application No. 2002/0075443 to Shimizu et al. ("*Shimizu et al.*") in view of U.S. Patent Application No. 2001/0026347 to Sawasaki et al. ("*Sawasaki et al.*") further in view of U.S. Patent No. 6,721,024 to Kishimoto et al. ("*Kishimoto et al.*").

The key to supporting any rejection under 35 U.S.C. § 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious. Such an analysis should be made explicit and cannot be premised upon mere conclusory statements. MPEP § 2142, 8th Ed., Rev. 6 (Sept. 2007).

"A conclusion of obviousness requires that the reference(s) relied upon be enabling in that it put the public in possession of the claimed invention." MPEP § 2145. Furthermore, "[t]he mere fact that references can be combined or modified does not render the resultant combination obvious unless the results would have been predictable to one of ordinary skill in the art" at the time the invention was made. MPEP §2143.01(III) (internal citation omitted). Moreover, "[i]n determining the differences between the prior art and the claims, the question under 35 U.S.C. § 103 is not whether the differences themselves would have been obvious, but whether the claimed invention

as a whole would have been obvious.” MPEP § 2141.02(I) (emphasis in original; internal citations omitted).

It would not have been obvious for one of ordinary skill to combine the teachings of *Shimizu et al.*, *Sawasaki et al.*, and *Kishimoto et al.* to obtain a “liquid crystal display panel” comprising, inter alia, “a plurality of first protrusions disposed on the first substrate substantially contacting the first areas of the second substrate for maintaining a first cell gap between the first and second substrates; a plurality of second protrusions disposed on the first substrate corresponding to the second areas of the second substrate, tops of the second protrusions separated from the second areas of the second substrate by a predetermined distance in such a manner that the second protrusions contact the second areas of the second substrate when the liquid crystal display panel is subjected to an external force to maintain a second cell gap between the first and second substrates, the second cell gap being smaller than the first cell gap; and a plurality of third protrusions disposed on at least one of the first and second substrates for regulating orientation of the liquid crystal layer; wherein the first and second protrusions are made of a first material and the third protrusions are made of a second material, the first material being harder than the second material,” as recited in independent claim 21 (emphasis added). The combination of teachings from *Shimizu et al.*, *Sawasaki et al.*, and *Kishimoto et al.* that is apparently suggested by the Examiner fails to include any teaching or suggestion that “the first and second protrusions are made of a first material and the third protrusions are made of a second material, the first material being harder than the second material,” as recited in claim 21.

Shimizu et al. teaches, “[a] liquid crystal panel is manufactured by sticking together two substrates, i.e., the TFT substrate 100A and the color filter substrate 100B. [T]he TFT substrate 100A and the color filter substrate 100B are disposed to oppose each other with a gap in which to interpose the liquid crystal layer 9 being provided therebetween” (paragraph [0077]). “FIG. 6A shows a case where a spacer 1b is provided at the location indicated at D in FIG. 7, while FIG. 6B shows a case where a spacer 1c is provided at the location indicated at E in FIG. 7. . . . [T]he spacer 1b . . . is ordinarily placed in contact with the TFT substrate 100A, and works to form and maintain the gap between the TFT substrate 100A and the color filter substrate 100B” (paragraph [0085]).

Sawasaki et al. teaches, “FIG. 47 is a plan view showing a liquid crystal display device according to an eleventh embodiment . . . FIG. 48 is a sectional view showing the liquid crystal display device shown in FIG. 47” (paragraph [0271]). “The liquid crystal display device . . . consists of a TFT substrate 230, a CF substrate 240, and a vertically aligned liquid crystal 259 sealed between the TFT substrate 230 and the CF substrate 240” (paragraph [0272]). “Also, as shown in FIG. 47, domain defining projections 246a are formed under the color filters 223R, 223G, 223B in a zigzag fashion. Also, the resin films 246b are arranged at the ratio of three pixels to one at positions that correspond to intersecting points between the gate bus lines and the data bus lines. . . . [T]he resin films 246b are formed simultaneously with the projections 246a by the same resist film” (paragraph [0276]). “In addition, resin films 247 are formed at the intersecting points between the gate bus lines and the data bus lines respectively” (paragraph [0277]).

The Examiner acknowledges that neither *Shimizu et al.* nor *Sawasaki et al.* teaches that “the first and second protrusions are made of a first material and the third protrusions are made of a second material, the first material being harder than the second material,” as recited in claim 21 (Office Action, page 4, paragraphs 2 and 3).

Kishimoto et al. teaches, in reference to Figure 1, “[a] LCD [(liquid crystal display device)] 100 includes a first substrate 100a, a second substrate 100b, and a liquid crystal layer 30 sandwiched by the two substrates. The liquid crystal layer 30 includes liquid crystal molecules 33 having negative dielectric anisotropy” (col. 6, lines 14-17). “A first transparent electrode 12 made of ITO or the like is formed on the surface of a first transparent substrate 10 made of glass or the like facing the liquid crystal layer 30. Transparent polymer walls 16 made of a transparent resin material are formed on the first transparent electrode 12. On the top faces of the polymer walls 16, column protrusions 20 are selectively formed for defining the thickness of the liquid crystal layer 30 (cell gap)” (col. 6, lines 18-26). “The column protrusions 20 may be formed at an appropriate density so that a sufficient strength is provided” (col. 6, lines 31-33). “[T]he column protrusions 20 are formed on the wall structures 16 by photolithographic patterning using a photosensitive resin such as photosensitive polyimide” (col. 12, lines 34-37).

The Examiner asserts that *Kishimoto et al.* teaches forming “first and second protrusions of a material harder than the third protrusion material” (Office Action, page 5, paragraph 1). Applicant respectfully disagrees. The disclosure in *Kishimoto et al.* that the column protrusions (20) have a “sufficient strength” does not constitute any teaching or suggestion that the column protrusions (20) should be made of a first

material that is “**harder**” than a second material of the wall structures (16), as required by claim 1 (emphasis added). For example, *Kishimoto et al.* is silent on the strength of the column protrusions (20) relative to the wall structures (16). Rather, *Kishimoto et al.* merely states that the strength of the column protrusions (20) on their own should be “sufficient.”

Indeed, the disclosure of *Kishimoto et al.* that the column protrusions (20) “may be formed at an appropriate density so that a sufficient strength is provided,” indicates determining the strength of protrusions (20) collectively by adjusting their density, rather than choosing a material for forming each protrusion (20) to have a particular strength. Further, there is no suggestion as to what relationship may exist between the “strength” disclosed by *Kishimoto et al.* and the “hardness” claimed by Applicant.

Moreover, one of ordinary skill in the art would have understood that the overall yield strength of the abutting column protrusions (20) and wall structures (16) under compressive stress would effectively be the lesser of the yield strength of the column protrusions (20) and the yield strength of the wall structures (16). One of ordinary skill would therefore have understood that using a different material to fabricate column protrusions (20) that have a greater yield strength than the wall structures (16) would not improve the overall yield strength of the abutting structures because the wall structures (16) would inelastically deform at the same compressive stress regardless of the yield strength of the column protrusions (20). Thus, there would not have been any motivation to provide column protrusions (20) that have a greater strength than the wall structures (16).

Thus, *Shimizu et al.*, *Sawasaki et al.*, and *Kishimoto et al.* do not render obvious the limitation that “the first and second protrusions are made of a first material and the third protrusions are made of a second material, the first material being harder than the second material,” as recited in claim 21. Since the Examiner’s proposed combination of *Shimizu et al.*, *Sawasaki et al.*, and *Kishimoto et al.* fails to teach or suggest all elements of claim 21, claim 21 is allowable over *Shimizu et al.*, *Sawasaki et al.*, and *Kishimoto et al.* Furthermore, the Examiner has not identified any reason why one of ordinary skill would otherwise modify *Shimizu et al.*, *Sawasaki et al.*, and *Kishimoto et al.*, either alone or in combination, to obtain that “the first and second protrusions are made of a first material and the third protrusions are made of a second material, the first material being harder than the second material,” as recited in claim 21.

Independent claim 33 is not rendered obvious by *Shimizu et al.*, *Sawasaki et al.*, and *Kishimoto et al.* for reasons substantially similar to those explained above in relation to claim 21. For example, *Shimizu et al.*, *Sawasaki et al.*, and *Kishimoto et al.* fail to teach or suggest, alone or in combination, that “the first and second protrusions are made of a first material and the third protrusions are made of a second material, the first material being harder than the second material,” as recited in claim 33 (emphasis added).

Thus, since *Shimizu et al.*, *Sawasaki et al.*, and *Kishimoto et al.* do not render obvious independent claims 21 and 33, these claims and claims 23, 35, 38, 39, 41, and 42, which depend therefrom, are allowable over *Shimizu et al.*, *Sawasaki et al.*, and *Kishimoto et al.*

§ 103(a) Rejection of Claims 22, 24, 34, and 36 over Shimizu et al., Sawasaki et al., Kishimoto et al., and Miyachi et al.

Applicant respectfully traverses the rejection of claims 22, 24, 34, and 36 under 35 U.S.C. § 103(a) as unpatentable over *Shimizu et al.*, *Sawasaki et al.*, and *Kishimoto et al.* in view of U.S. Patent No. 6,211,937 to Miyachi et al. ("*Miyachi et al.*").

As explained above, *Kishimoto et al.* is silent on the strength of the column protrusions (20) relative to the wall structures (16). Moreover, one of ordinary skill in the art would have understood that the yield strength of the abutting column protrusions (20) and wall structures (16) under compressive stress would effectively be the lesser of the yield strength of the column protrusions (20) and the yield strength of the wall structures (16). Thus, there would not have been any motivation for one of ordinary skill to provide column protrusions (20) that have a greater strength than the wall structures (16).

Miyachi et al. does not make up for the deficiencies of *Shimizu et al.*, *Sawasaki et al.*, and *Kishimoto et al.* because *Miyachi et al.* also fails to teach or suggest that "the first and second protrusions are made of a first material and the third protrusions are made of a second material, the first material being harder than the second material," as recited in claim 21. The Examiner does not rely on *Miyachi et al.* for any teaching or suggestion that "the first and second protrusions are made of a first material and the third protrusions are made of a second material, the first material being harder than the second material," as required by claim 21.

Independent claim 33 is not rendered obvious by *Shimizu et al.*, *Sawasaki et al.*, *Kishimoto et al.*, and *Miyachi et al.* for reasons substantially similar to those explained above in relation to claim 21. For example, *Shimizu et al.*, *Sawasaki et al.*, *Kishimoto et al.*, and *Miyachi et al.* fail to teach or suggest, alone or in combination, that “the first and second protrusions are made of a first material and the third protrusions are made of a second material, the first material being harder than the second material,” as recited in claim 33 (emphasis added).

Thus, since *Shimizu et al.*, *Sawasaki et al.*, *Kishimoto et al.*, and *Miyachi et al.* do not render obvious independent claims 21 and 33, claims 22, 24, 34, and 36, which depend therefrom, are allowable over *Shimizu et al.*, *Sawasaki et al.*, *Kishimoto et al.*, and *Miyachi et al.*

CONCLUSION

In view of the foregoing remarks, Applicant respectfully requests reconsideration of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our Deposit Account No. 06-0916.

Respectfully submitted,

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GARRETT & DUNNER, L.L.P.

Dated: February 6, 2008

By: _____

A handwritten signature in cursive script, appearing to read "Reece Nienstadt", written over a horizontal line.

Reece Nienstadt
Reg. No. 52,072